Ground Fault Circuit Interrupters Save Lives

Ground Fault Circuit Interrupters (GFCI) are not new to home building. They became a requirement for specific locations in new homes in the mid-1970s. In the National Electrical Code, they are required in "wet" locations like kitchens and bathrooms. Their purpose is to protect people from electrocution.

Ground fault is a term used to describe electrical current that unintentionally flows to ground. This is dangerous when the path it takes is through a person. This sometimes happens when a person is standing in water or on a wet floor and comes in contact with the "hot" side of an electrical outlet or appliance, or when their hands are wet and the water drips inside the appliance and makes contact with the electrical circuit inside.

If the electrical current has a ground fault through a person, the result can be a severe electrical shock or possibly death by electrocution. The chances are small for electrocution in the United States. According to the Consumer Product Safety Commission (CPSC), a person's chances of being electrocuted involving a consumer product in the United States is less than one in a million per year for the latest yearly figures available.[1]

The CPSC, which has been tracking electrocution deaths associated with consumer products for years, says the number of electrocutions per year has been dropping. There has been a 39 percent reduction since 1987 -- 310 electrocution deaths in 1987 versus 190 electrocution deaths in 1997.[2] The drop in electrocutions over the years may be associated with the growing use of GFCIs because of the requirement of GFCI protection in the building codes.

Because they are code required, you are probably familiar with the electrical outlets with ground fault protection. They have the test and reset buttons. These are common in bathrooms and kitchens.

GFCI Outlet

There are also GFCI circuit breakers that snap into the main electrical panel.

GFCI Circuit Breaker

They look and function just like a typical circuit breaker, sensing for overloaded circuits and short circuits. But the GFCI circuit breaker also senses for ground faults, just like the GFCI outlets. However, the GFCI circuit breaker provides the ground fault protection on all outlets on that branch circuit. A GFCI outlet will only protect at that outlet and any outlet downstream on that branch circuit.

A GFCI outlet or circuit breaker works by measuring the electrical current on the "hot" wire and "neutral" wire of the branch circuit. Under normal circumstances electricity flows out from the

main electrical panel in the "hot" wire and back to the main electrical panel on the "neutral" wire completing the circuit. The amount of electrical current in these two wires should be equal or close to equal.

When a ground fault occurs, the amount of current flowing back to the panel drops because it is flowing to ground. The GFCI outlet or circuit breaker senses this difference and trips. This breaks the circuit and stops the flow of electricity.

Underwriters Laboratories Standard 943 requires a Class A GFCI to trip when there is a ground fault current of 6 milli-amps (mA). This is a very small electrical current and was set at a level to be well below the amount of electrical current that would send a normal healthy adult's heart into fibrillation.

The typical circuit breaker is not designed for ground fault safety and may not trip at a low enough current to protect an individual from electrocution.

In older houses with two-wire (no ground wire) branch circuits the electrical code many times requires that a ground wire be installed or a GFCI outlet be installed if an electrical outlet is to be replaced. A GFCI will work even if no ground wire is present.

The cost for a GFCI outlet is about $8 to $10 (material only) compared to a regular outlet which about $1 to $2 (material only). The GFCI circuit breakers are more expensive; between $40 and $100 (material only) compared to a regular circuit breaker at $8 to $12 (material only).

If your home is older and does not have GFCI outlets in wet areas like the kitchen and bathrooms or the home has two-wire branch circuits, consider installing GFCI outlets or circuit breakers. In new homes GFCI protection will be required for specific locations. Now you know this can be accomplished with a GFCI outlet or a GFCI circuit breaker.

[1]"1997 Electrocution Associated with the Use of Consumer Products"; United States Consumer Product Safety Commission; April 5, 2000 CPSC Memo; Signe Hiser, M.S. in the Division of Hazard Analysis

[2]"1997 Electrocution Associated with the Use of Consumer Products"; United States Consumer Product Safety Commission; April 5, 2000 CPSC Memo; Signe Hiser, M.S. in the Division of Hazard Analysis

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